REMARKS

Claims 1-9 and 24-28 are pending and under consideration. Claims 10-23 and 29-37 were withdrawn previously.

In the Office Action of June 2, 2005, claims 1-6, 9 and 24-28 were rejected under 35 USC § 102(e) as being anticipated by Hatano et al., US Pat. No. 6,756,614 (" '614 ") and claims 7-8 where rejected under 35 USC § 103(a) as being unpatentable in light of the above reference. Applicants respectfully submit that '614 neither anticipates nor reasonably suggests the forming of a crystalline material by uniformly heat-treating an amorphous or polycrystalline material.

The pending claims are drawn to methods for preparing crystalline semiconductor materials and devices containing such semiconductor materials. The methods are based upon subjecting a film of amorphous silicon to a uniform heat treatment, for instance by applying a plane energy beam (*See* par. [0047]). In this regard, claims 1 and 24 recite, in pertinent part, that the claimed method comprises a "[...] second step of forming a crystalline material by uniformly heating said amorphous material or said polycrystalline material [...]".

The heat treatment is set to heat the amorphous silicon at such a temperature as to partially melt silicon crystal grains having {100} orientation with respect to the direction vertical to the substrate, while perfectly melting silicon crystal grains having face orientation other than the above {100} orientation (*See* par. [0048]).

Without being bound to any particular theory, it appears that the silicon crystals grains having the {100} orientation do not perfectly melt because their melting points are higher than those of silicon crystal grains having other orientations (*See* par. [0049]). Also, the Interface energy between silicon crystal grains having the above {100} orientations and a substrate silicon oxide film is smaller than the interface energy between such a film and silicon crystal grains preferentially grown in other orientations (*See* par. [0049]), a factor leading to the random formation of silicon crystals having the {100} orientation in order to minimize the interface energy (*See* par. [0062]; Fig. 3A).

Accordingly, upon solidification of the melted silicon, silicon crystals grains with the above {100} orientation are formed (*See* Fig. 3B). Additional crystals with this

orientation are formed if the above process is repeated (*See* Fig. 3C), yielding a polycrystalline film containing square crystal grains preferentially grown in the {100} orientation (*See* pars. [0064]-[0065]; Fig. 5A; Fig. 6A; Fig. 7A).

By contrast, the process disclosed in the '614 reference does not rely upon uniformly heat-treating an amorphous silicon film. Rather, the amorphous silicon film or polycrystalline silicon film is first etched, forming projecting crystal nucleus regions (*See* col. 8, ll. 49-52; Fig. 3B). The thus prepared substrate is then irradiated with a laser beam with an <u>inclined intensity distribution</u> (*See* col. 8, ll. 25-26; col. 8, ll. 52-53; Fig. 1(c); Fig. 3(c)). When a laser beam is irradiated with such an intensity distribution, crystallization starts from the lower-temperature crystal nucleus region (*See* col. 8, ll. 34-40; Fig. 3(c)), and the methods disclosed by '614 rely upon this feature to drive crystal growth.

Consequently, the methods disclosed in the cited reference do not include uniformly heat-treating a silicon substrate as claimed in independent claims 1 and 24 of the present application. Rather, as set forth above, the methods of '614 rely on non-uniformly heating the silicon substrate. The claims of the present application are therefore neither anticipated by nor obvious in light of the '614 reference.

In view of the foregoing, Applicants submit that pending claims 1-9 and 24-28 are now patentable and that the present application is in condition for allowance. Notice thereof is respectfully requested.

Dated: September 1, 2005

Respectfully submitted,

W. John Keyes
Registration No. 54,218
Agent for Applicants

SONNENSCHEIN NATH & ROSENTHAL LLP
P.O. Box 061080
Wacker Drive Station, Sears Tower
Chicago, IL 60606-1080

Attorney Customer Number: 026263
Phn: (312) 876-8000
Fax: (312) 876-7934

14456900v2